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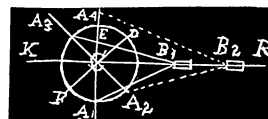
182. Proposed by A. H. HOLMES, Brunswick, Maine.

Evaluate  $\int_0^{\frac{1}{2}\pi} d\theta \sqrt{[1 + \sin^2 \theta (1 - 4 \cos \theta)]}$ .

### MECHANICS.

170. Proposed by ELISHA S. LOOMIS, Berea, Ohio.

Two angles of iron,  $A_1CD$  and  $A_1CA_3$ , move freely on a pivot at  $C$ . Rods  $B_1A_1$  and  $B_1A_3$  are attached respectively at  $A_1$  and at some point  $A_3$  so that when  $B_1$  moves along the rod  $CR$ , which is perpendicular to  $A_1A_4$ ,  $CD$  and  $CA_3$  shall coincide in position with  $CE$  which is perpendicular to rod  $KR$ . When angle  $A_1CD$  is  $135^\circ$  find  $CA_3$  in terms of  $CA_1$ .



Also find the following:

1. That value of  $CB_1$  which will require least effort exerted at  $B_1$  to cause  $CA_3$  to take the position  $CA_4$ .
2. That value of  $CB_1$  which will cause  $B_2A_2$ , if produced, to pass through the point  $A_1$ .
3. As  $CB_1$  varies in value, what is the locus of the intersection of  $A_1B_1$  and  $A_2B_2$ ? Of  $B_1A_3$  and  $B_2A_4$ ?
4. Suppose angle  $A_1CD$  to be any other angle than  $135^\circ$ , then find  $CA_3$  in terms of  $CA_1$ .

### GROUP THEORY.

5. Proposed by L. E. DICKSON, Ph. D., The University of Chicago.

In lieu of the incorrect developments of Burnside, *Theory of Groups*, pp. 56-58, show that an Abelian group of type  $(m_1, m_2, \dots, m_r)$ ,  $m_1 \bar{s} m_2 \bar{s} \dots m_r$ , has a subgroup of type  $(n_1, n_2, \dots, n_s)$ ,  $n_1 \bar{s} n_2 \bar{s} \dots n_s$ , if and only if  $s \bar{s} r$ ,  $n_i \bar{s} m_i$  ( $i=1, \dots, s$ ).

### MISCELLANEOUS.

145. Proposed by H. F. MacNEISH, Chicago, Ill.

Two complete 5-plane configurations in space having the same vertices are identical; in general two complete  $(n+2)$ -faces in  $n$ -space having the same vertices are identical.

### NOTES.

Dr. H. L. Rietz has been promoted to an assistant professorship at the University of Illinois.

J. H. Tanner and James McMahon have been promoted to full professorships in Mathematics at Cornell University.

Dr. G. A. Bliss of the University of Chicago has been appointed to an assistant professorship at the University of Missouri.

Mr. A. W. Whitney and Dr. D. N. Lehmer have been promoted to Assistant Professorships of Mathematics at the University of California.

The San Francisco Section of the American Mathematical Society will hold its sixth meeting on October 1, 1904, at the University of California.

Prof. D. N. Lehmer of the University of California, is preparing, under the auspices of the Carnegie Institution, a table of the smallest factors of all numbers up to ten million.

Dr. Robert E. Moritz, of the University of Nebraska, has been elected Professor of Mathematics in the University of Washington to succeed Prof. Arthur Ranum who has resigned.

Mr. Frank Gustave Radelfinger, Assistant Professor of Mathematics in the Washington University and a practising patent attorney, died at Washington on August 15, at the age of thirty-four years.

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### BOOKS.

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*Rational Geometry.* By Prof. George Bruce Halsted. John Wiley & Sons, publishers, 1904. A text book of the usual elements of geometry based on Hilbert's "Foundations."

The modern standpoint permits many simplifications in the development of geometrical theory, of which our author skillfully avails himself. Of the many notable features of this book it suffices to mention only the treatment of Proportion, Equivalence, Areas, Volumes, Pure Spherics, the absence of the theory of limits, of a continuity assumption, the presence of the ruler as a sect-carrier displacing the compasses. This volume of 285 pages contains all that is essential to a course in elementary geometry. The language is simple, the logic exact, the exposition masterly, as was to be expected from Dr. Halsted. The book seems admirably adapted to class use. The already great indebtedness of teachers of geometry to Dr. Halsted has been manifoldly increased by the publication of this book, which, in the opinion of the writer and with no intended disparagement of others, is the most important contribution to the text-book literature of elementary geometry which has appeared. And now that the way has been opened may we not hope that the teachers of geometry in the secondary schools and colleges will see to it that the present generations of pupils shall receive the benefits rightly accruing to them through the profound researches of the present and last centuries on the foundations of geometry.

T. E. McKINNEY, Marietta, Ohio.

### ERRATA (in June-July No.)

Page 146, line 5, for  $9mx^4x$  read  $9mx^4$ .